

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventors: Pak *et al.*

Attorney Docket No.: SAND-P024B-CIP

Serial No.: Not yet assigned

Group Art Unit: 2819

Filed:

Examiner: Le, D.

5 Title: Dynamic Circuit Using Exclusive States

**PRELIMINARY AMENDMENT**

The Commissioner of Patents and Trademarks

10 Washington, D.C. 20231

Sir:

**IN THE SPECIFICATION**

15 Please insert the following text underneath the title to claim the priority of the parent application:

--RELATED U. S. APPLICATION DATA--

On the next line, please insert --This Application is a Continuation-in-Part of U.S. Patent  
20 application Serial No. 09/970,250, entitled "Dynamic Circuits Using Exclusive States" by  
Pak, et al., filed on 10/4/01.--

Please insert the following paragraph on page 6, line 12:

In one embodiment of the invention, the terms k, p, g can be defined as:

25 k (carry out termination/kill) => -A & -B

p (carry out propagation) => A<sup>^</sup> B or A+B

g (carry out generation) => A & B

where A and B are inputs such as A<sub>0</sub>, B<sub>0</sub>, A<sub>1</sub>, B<sub>1</sub>, A<sub>2</sub>, B<sub>2</sub>, A<sub>3</sub>, B<sub>3</sub>, as referenced in Figure

30 2.

Please insert the following paragraphs on page 6, line 20:

Additionally, the terms k, p, g can be defined in groups as follows:

5

$$gk(i:0) = k(i) + p(i) \& gk(i-1:0)$$

$$gp(i:0) = p(i) \& gp(i-1:0)$$

$$gg(i:0) = g(i) + p(i) \& gg(i-1:0)$$

10 For example, when  $i = 1$ ,  $gk$ ,  $gg$ ,  $gp$  corresponds to  $gk_{1:0}$ ,  $gg_{1:0}$ ,  $gp_{1:0}$ , as referenced in Figure 2.

Also, for  $i > j > k$ ,

15  $gk(i:k) = gk(i:j) + gp(i:j) + gk(j-1:k)$

$$gp(i:k) = gp(i:j) + gp(j-1:0)$$

$$gg(i:k) = gg(i:j) + gp(i:j) + gg(j-1:k)$$

Group level inversions can be accomplished as a function of true terms as follows:

20

$$\sim gk(i:k) = gp(i:k) + gg(i:k)$$

$$\sim gp(i:k) = gg(i:k) + gk(i:k)$$

$$\sim gg(i:k) = gp(i:k) + gk(i:k)$$

25 In this embodiment, the terms k, p, g are mutually exclusive and the terms  $gk$ ,  $gp$ ,  $gg$  are mutually exclusive. By using exclusivity nature of the terms k/p/g and  $gk/gp/gg$ , inversion of signals can be expressed in terms of monotonic signals.

IN THE CLAIMS

Please add claims 30-42.

5 30. (New) A dynamic adder to generate dynamic logic inversions, said dynamic adder comprising:

a dynamic circuit implementing a mutually exclusive circuit to indicate a three terms carry logic, wherein an inversion of any group of said three terms carry logic at the dynamic circuit is implemented as a function of true terms.

10

31. (New) The dynamic adder of claim 30, wherein the three terms carry logic is propagate(p), generate (g), and kill (k)

15

32. (New) The dynamic adder of claim 30, further comprising additional dynamic circuits arranged in levels to form a carry chain.

20

33. (New) The dynamic adder of claim 30, wherein the groups of said three terms carry logic comprises group propagate (gp), group generate (gg), and group kill (gk).

25

34. (New) The dynamic adder of claim 33, wherein the groups of said three terms carry logic are mutually exclusive.

35. (New) The dynamic adder of claim 34, wherein the inversion is implemented by  $(\sim gk) = (gp) + (gg)$ .

30

36. (New) The dynamic adder of claim 34, wherein the inversion is implemented by  $(\sim gp) = (gg) + (gk)$ .

37. (New) The dynamic adder of claim 34, wherein the inversion is implemented by  $(\sim gg) = (gp) + (gk)$ .

38. (New) A method of implementing dynamic inversions in a carry chain comprising the steps of:  
implementing a three terms logic carry chain, wherein the three carry signals are generate (g), propagate (p), and kill (k);  
inversion of a group of said signals by utilizing a function, wherein said function is a function of true terms.

39. (New) The method of claim 38, wherein the function is  $(\sim gp) = (gg) + (gk)$ .

40. (New) The method of claim 38, wherein the function is  $(\sim gg) = (gp) + (gk)$ .

41. (New) The method of claim 38, wherein the function is  $(\sim gk) = (gg) + (gp)$ .

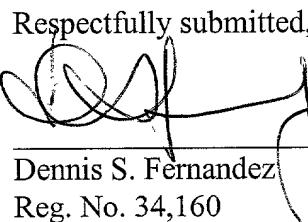
42. (New) The method of claim 38, wherein the groups of the three carry signals, (gg), (gp), and (gk) are mutually exclusive.

REMARKS

Newly added claims 30-42 relating to a dynamic adder are pending in this  
5 application. Claims 4-29 are withdrawn from this Continuation-in-Part and stand pending  
in the divisional application, Serial No. 09/970,250. Claims 30-42, supported by the  
additional text added in the Specification, are submitted for further prosecution as a  
Continuation-in-Part application of the parent application, Serial No. 09/970,250.

10 Attached hereto is a marked-up version of the changes made to the specification.  
The attached page is captioned "**Version with markings to show changes made.**"

In view of the above, it is respectfully submitted by Applicants that the claims are  
15 in condition for allowance. Allowance of the claims at an early date is solicited.

Respectfully submitted,  
  
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Date: 11/27/01

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**"VERSION WITH MARKINGS TO SHOW CHANGES MADE"**

**IN THE SPECIFICATION**

5

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gp (i:0) = p(i) & gp(i-1:0)  
gg (i:0) = g(i) + p(i) & gg(i-1:0)

30                    For example, when i = 1, gk, gg, gp corresponds to gk<sub>1:0</sub>, gg<sub>1:0</sub>, gp<sub>1:0</sub>, as referenced  
in Figure 2.

Also, for  $i > j > k$ ,

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$$gp(i:k) = gp(i:j) + gp(j-1:0)$$

$$gg(i:k) = gg(i:j) + gp(i:j) + gg(j-1:k)$$

5

Group level inversions can be accomplished as a function of true terms as follows:

$$\sim gk(i:k) = gp(i:k) + gg(i:k)$$

10  $\sim gp(i:k) = gg(i:k) + gk(i:k)$

$$\sim gg(i:k) = gp(i:k) + gk(i:k)$$

In this embodiment, the terms k, p, g are mutually exclusive and the terms gk, gp, gg are mutually exclusive. By using exclusivity nature of the terms k/p/g and gk/gp/gg, 15 inversion of signals can be expressed in terms of monotonic signals.

15

#### IN THE CLAIMS

Please add claims 30-42.

20

30. (New) A dynamic adder to generate dynamic logic inversions, said dynamic adder comprising:

a dynamic circuit implementing a mutually exclusive circuit to indicate a three terms carry logic, wherein an inversion of any group of said three terms carry logic at 25 the dynamic circuit is implemented as a function of true terms.

31. (New) The dynamic adder of claim 30, wherein the three terms carry logic is propagate(p), generate (g), and kill (k)

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32. (New) The dynamic adder of claim 30, further comprising additional dynamic circuits arranged in levels to form a carry chain.

33. (New) The dynamic adder of claim 30, wherein the groups of said three terms carry logic comprises group propagate (gp), group generate (gg), and group kill (gk).

5 34. (New) The dynamic adder of claim 33, wherein the groups of said three terms carry logic are mutually exclusive.

35. (New) The dynamic adder of claim 34, wherein the inversion is implemented by  $(\sim gk) = (gp) + (gg)$ .

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40. (New) A method of implementing dynamic inversions in a carry chain comprising the steps of:  
implementing a three terms logic carry chain, wherein the three carry signals are generate (g), propagate (p), and kill (k);  
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39. (New) The method of claim 38, wherein the function is  $(\sim gp) = (gg) + (gk)$ .

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40. (New) The method of claim 38, wherein the function is  $(\sim gg) = (gp) + (gk)$ .

41. (New) The method of claim 38, wherein the function is  $(\sim gk) = (gg) + (gp)$ .

30

42. (New) The method of claim 38, wherein the groups of the three carry signals,  $(gg)$ ,  $(gp)$ , and  $(gk)$  are mutually exclusive.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): Pak, et al.

Application No.: 09/970,250

Art Unit No.: 2819

Filed: 10/4/01

Title: Dynamic Circuit Using Exclusive States

Examiner: Le. D.

Attorney Docket No.: SAND-P024B-CIP

Commissioner for Patents

Washington, D.C. 20231

**CORRECTED DRAWING TRANSMITTAL LETTER**

Sir:

Enclosed herewith please find:

( )        sheets of redlined drawing(s) which indicate proposed changes to the drawing(s). Upon approval of these proposed changes, formal drawing(s) will be submitted.

( )        sheets of substitute informal drawing(s) as required in 37 CFR 1.84(g). Please substitute the drawing(s) for the informal drawing(s) originally filed.

( )        sheets of corrected formal drawing(s), as required by the Notice of Patent Drawings Objection (PTO-948) which accompanied the Office Action dated \_\_\_\_\_.

( )        sheets of corrected formal drawing(s), as required by the Notice of Patent Drawing(s) Objection (PTO-948) and approved in the Notice of Allowability dated \_\_\_\_\_.

(X) 1 sheet(s) of corrected drawing(s). Please substitute these corrected drawing(s) for the informal drawing(s) originally filed.

Examiner's approval of the entry of these drawings is respectfully requested. No new matter has been added.

I hereby certify that this correspondence is being deposited with the United States Postal Service as express mail in an envelope NO. 88984272 addressed to: Commissioner for Patents, Washington, D.C. 20231.

Date of Deposit. 11.27.01

Typed Name: Lora Paredes

Signature: Dennis S. Fernandez

Respectfully Submitted,

By \_\_\_\_\_

DENNIS S. FERNANDEZ, Esq

Reg. No. 34,160

Date: 11/27/01

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SCANNED # 10

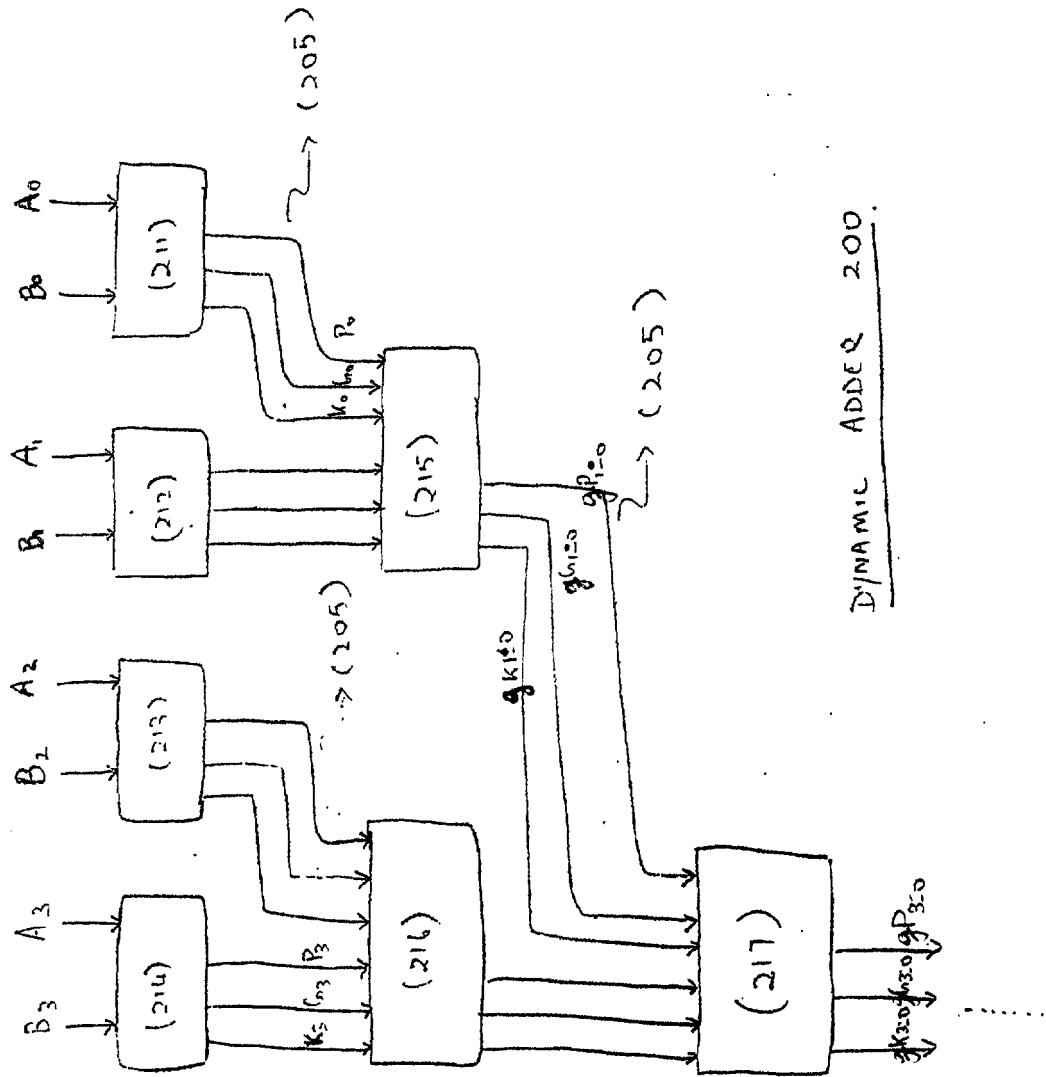


Figure - 2

Application No.: 09/970,250 Filing Date: 10/4/01  
Title: Dynamic Circuit Using Exclusive States  
Art Unit: 2819 Examiner: Le, D.